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ABSTRACT

Seventeen teachers and a university research team cooperated to compare the effects of team teaching and conventional instruction in biology on student achievement in six high schools in the Rochester, New York, area between 1964 and 1968. Student achievement was measured by the New York State Regents examination in biology, five locally developed unit tests administered during the course, and the Nelson Biology Test administered nine months after completion of the course. Data were treated by analysis of covariance using as covariables scores on the School and College Ability Test, Sequential Test of Educational Progress in Reading and Science, and a biology pretest developed for the project. Sex was also treated as an independent variable in some analyses. The results provided no evidence for the superiority of one method over the other, nor was there any evidence of a general improvement in biology instruction. Teachers' subjective evaluations of team teaching were studied by means of a questionnaire, and agreed advantages and disadvantages are listed. The report includes a review of the literature on team teaching, descriptions of scheduling arrangements, and the development of the unit tests and pretests. Appendices give the analysis of covariance tables and a copy of the teacher questionnaire. (EB)

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A Comparison of a Team Approach and a Conventional Approach on Achievement in High School Biology

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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Principal Investigator:

David B. Robinson
Assistant Superintendent for Instruction
Greece Central Schools District #1
Rochester, New York

July, 1968

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Genesee Valley School Development Association
100 Allens Creek Road
Rochester, New York

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New York State Experimental and Innovative Programs
Article 73, Section 3602_a, Subdivision 14 of the State Education Law

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Principal Investigator:

Mr. David B. Robinson, Assistant Superintendent for Instruction, Greece Central School District #1

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Dr. John J. Montean, Science Education Consultant, the University of Rochester

Dr. John Schmitt, Research Consultant, Boston College

Dr. Paul H. Joslin, Testing Consultant, Drake University

Project Coordinator:

Mr. Robert Fitzgibbon, District Science Supervisor, Greece Central School District #1

Participating Teachers:

Teachers	School	Year
Mr. Richard Joyce	Brighton High	1964-1968
Mrs. Doris Tondat	" "	" "
Mrs. Ruth Sternbach	" "	" "
Mr. George Caraker	Eastridge High	" "
Mr. John Lehr	" "	" "
Mrs. Lucinda Wilcox	" "	" "
Mrs. Marcia Fishbach	East Rochester High	1965-1968
Mrs. Shiela Jacobstein	" "	1964-1965
Miss Mary Jane Kunzog	" "	1964-1968
Mrs. Valerie Cole	Greece Arcadia High	1964-1965
Miss Mary Crittenden	" "	1965-1967
Mr. Anthony D'Imperio	" "	1964-1966
Mr. Robert Fitzgibbon	" "	1964-1966
Mr. James Rankin	" "	1966-1968
Mr. Ralph Sawyer	" "	1966-1968
Mrs. Marjorie Hawkes	Monroe High	1964-1968
Mr. John McCrank	" "	" "
Mr. Noel Schlageter	" "	" "
Mrs. Kay Drury	Rush-Henrietta High	1966-1968
Mr. David Gordon	" "	1964-1966
Mrs. Alice Tischio	" "	1966-1968
Mr. Havilah Toland	" "	1964-1968
Mrs. Hether Turner	" "	1964-1965

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Name	Position	School
Mr. Fred Painter	Superintendent of Schools	Brighton District #1
Dr. William Greenham	Principal	Brighton High
Mr. Whitney Callahan	Science Department Chairman	" "
Dr. Ross Willink	Superintendent of Schools	East Irondequoit
Dr. Harold Odell	Principal	Eastridge High
Mr. John Euler	Science Department Chairman	" "
Mr. Lewis Obourn	Superintendent of Schools	East Rochester
Dr. Frank O'Donnell	Principal	" "
Miss Laura Cashion	Science Department Chairman	" "
Dr. Lawrence Watts	Superintendent of Schools	Greece Central District #1 (1964-1966)

Name	Position	School
Mr. Burton Silberman	Principal	Greece Arcadia High (1964-1966)
Mr. Donald Haefele	Principal	Greece Arcadia High (1966-1968)
Mr. Harold Bowman	Science Department Chairman	Greece Arcadia High
Mr. Herman Goldberg	Superintendent of Schools	Rochester City School District
Mr. Clarence Evaul	Chief Consultant-Science	Rochester City School District
Mr. Ira Berman	Principal	Monroe High
Mr. Sam Ronshiem	Science Department Chairman	" "
Mr. John Parker	Superintendent of Schools	Rush-Henrietta Central District No. 1
Mr. Charles Kinyon	Principal	Rush-Henrietta High (1964-1965)
Mr. George Rittenhouse	Principal	Rush-Henrietta High (1965-1966)
Mr. L. A. Prince	Principal	Rush-Henrietta High (1966-1968)
Mr. Philip Saunders	Science Department Chairman	Rush-Henrietta High

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CHAPTER I

INTRODUCTION

As a pattern of staff utilization and as a technique of instruction, team teaching has many claimed advantages. It has been the purpose of this study to test some of these claims.

Team teaching can be defined in as many ways as there are teaching teams. Team teaching is what a teaching team does. A definition that applies universally is supplied by Shaplin:

> Team teaching is a type of instructional organization involving Teaching Teams and the students assigned to them, in which two or more teachers are given responsibility, working together, for all or a significant part of the instruction of the same group of students.[1]

Team teaching is a phenomenon of the last decade and its use has spread with the rapidity of a fad.[2] Before this study began in 1964, it was estimated that at least 1500 teachers and 45,000 students would be involved in team teaching during the 1964-65 school year and that in the following year, it would be part of the organization of three out of five elementary schools.[3] This rapid acceptance occurred in spite of the absence in the literature of objective empirical reports that it was better for students, or that it produced higher academic achievement. While many advantages were claimed, they tended to be for teachers, and even these were not tested objectively under controlled conditions. There remained the problem of comparing team teaching and conventional teaching under controlled conditions, in several different schools, using a variety of students as subjects.

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[1] Judson T. Shaplin and Henry F. Olds (eds.), Team Teaching (New York: Harper and Row, 1964), p. 15.

[2] Education Index (Bronx, New York) lists no articles on team teaching for the period June 1953 through May 1955. Eight articles are listed for the period June 1955 through May 1957, seventy-two for the next two-year period and one hundred thirty-six for the two-year period ending May 1963.

[3] "Team Teaching: An Idea in Action," in The Shape of Education (Washington: National Education Association, 1965), p.33

A project to attempt this was planned and accepted by six high schools in the Rochester, New York, area. The main purpose of the study was to determine whether either type of instruction would produce higher academic achievement as it is customarily defined.

CHAPTER II

REVIEW OF THE LITERATURE

The literature is full of reports by teachers and administrators who gave team teaching a try, and liked it. There are few reports favoring the conventional one-teacher one-class approach when it is compared to the team approach. The layman might interpret this difference in numbers of reports as statistical evidence in favor of team teaching. However, there are reasons for the difference that are unrelated either to the merits of team teaching or to the extent of its acceptance.

In a rapidly-changing world, individuals and institutions must make rapid adjustments to environmental (or cultural) change. Like other social institutions, schools must quickly adjust to changes in population, technology, political structure, and the shift towards urbanization. In such a situation it becomes nearly impossible to assess the value, or the effectiveness, of any change in educational practice. The uncontrolled variables of environmental change interfere and make it extremely difficult, if not impossible, to distinguish between valid innovation and ineffective change.

These rapid cultural changes produce a need to seek new ways but also induce an attitude of seeking change for its own sake. In such an atmosphere any new practice receives a favorable acceptance, and may do so without supportive evidence either from controlled research or an adequate pilot-test. A wrong decision is not likely to be exposed because environmental changes quickly mask the conditions under which the decision was made.

Then too, there is widespread misuse of the term Experiment, both conceptually and operationally. Any new practice that is being tried out is said to be experimental. Thus by calling team teaching attempts, experimental, an air of scientific authenticity is attached and they can then be favorably reported in the journals. And because almost no one wishes to acknowledge failure of a practice he is suggesting as good, only evidence in support of the practice is gathered and reported.

On the other hand, the person who collects evidence in support of the status quo, or evidence against a new practice, subjects himself to criticisms of being rigid or reactionary. And if neither of these discourages him sufficiently, his evidence is refuted for lack of controls, or of objectivity,--the very things for which the innovator should be criticized.

Another situation that prevents an objective consideration of the merits of a suggested innovation is the lack of research funds in school budgets. The costs of experimenting with, or trying out an innovation, must be borne out of operational funds. Thus, an innovation must be sold to the general public on the basis of its merits only. Its demerits must either be minimized or overlooked entirely. Once the try-out is underway, the initial costs must be justified by defending its continuance. This is of course, best done by seeking evidence only in support of the innovation.

Even in schools where there is the desire to conduct controlled research, the high cost of adequate controls, data collection, and data treatment, tends to preclude it. In the case of this study, six willing school districts, seventeen cooperative and able teachers, a school development association, and a university research staff were all available, but the money had to come from the state research budget.

For these reasons, reports in the literature tend to be highly subjective and in support of team teaching. It is difficult to determine whether or not its acceptance has been on solid, defensible, subjective bases, or whether those who favor it do so because they favor innovation and are also those most inclined to publish.

In either case, the claimed advantages are impressive, and in spite of the precautions noted above, they cannot easily be ignored. Nor can they be dismissed solely for the lack of empirical evidence. To the extent that teaching is an art, and given that teachers are professionals and no more biased than other investigators, their claims have validity. Furthermore, observations even casually made, provide the bases for hypotheses formulation and subsequent testing.

The claimed advantages of team teaching are not without a theoretical base. Brownell and Taylor (1962) deduced a set of hypothesized advantages and disadvantages from a set of basic assumptions (premises) about school and educational practice. Their assumptions relating to improved academic achievement through team teaching are listed here:

1. The particular talents of teachers should be used.
2. Teachers should be free from routine clerical tasks.
3. Teachers should keep up with the growth of knowledge, particularly in their own subject matter areas.
4. Members of a faculty cannot function effectively in isolation.

5. Teachers have an increased responsibility for assisting in the training and education of new members of the profession.
6. Sequences of subject matter content and intellectual processes should be conceived and developed for grades one through twelve.
7. Schools should be flexible with respect to scheduling classes and grouping students.[1]

Claimed Advantages

Perhaps the most essential feature of team teaching is the team planning session, for it gives rise to many of the differences between it and conventional instruction. Nearly all reports indicate that more in-school planning time is required but that this possible disadvantage is offset by other time made available for individual preparations (Anderson and Winkelman, 1962; Michael, 1963).

The exchange and hybridization of ideas occurring in the planning sessions results in a more sequential arrangement and better correlation of unit topics, with less repetition and more efficient articulation of subject matter. This results in less boredom and in greater interest by students. The students also benefit from a variety of personalities, opinions, and instructional strategies. Team evaluation of pupil performance is more equitable, and also results in improved guidance because of an exchange of information about pupils gained in a variety of situations (Brownell and Taylor, 1962).

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[1] John A. Brownell and Harris A. Taylor, "Theoretical Perspectives for Teaching Teams," Phi Delta Kappan, 43: 150-157, January, 1962.

The team approach is said to be one of the best methods of in-service training (Anderson, 1960; Ohm, 1961). New teachers benefit from the experience of older teachers, and the latter not only learn from the former but are stimulated by their enthusiasm. New teachers may at first be assigned fewer responsibilities and thereby have a greater chance for initial success. Both new and experienced teachers may be observed in action, and post-class critical evaluation by peers leads to teacher improvement (Battrick, 1962).

Team planning, and the simultaneous availability of several teachers make it possible to group and regroup students according to needs, instructional purposes, and special interests (Brownell and Taylor 1962). Similarly, it is possible to vary the length of the instructional period, and where possible, to arrange for individualized instruction.

The team approach builds stability and continuity into the instructional program in spite of changes in personnel from year to year (Anderson, 1960). The common experiences of children build enthusiasm on the part of parents (Brownell and Taylor, 1962).

In a survey of parents' reactions to educational innovations, team teaching had the highest and most uniform acceptance with 84% reporting it as a "good idea".[2]

It is possible to obtain most of the claimed advantages of team teaching with a team of peers. Each teacher may select a topic for which he considers himself a specialist and then perform all the tasks in several roles as is normally required in a conventional approach. In fact, all previously mentioned advantages are claimed to hold with such a team. Partial exploitation of teacher strengths, and at least some amelioration of teacher weaknesses may be expected. However, other advantages may accrue to a team organized as a hierarchy.

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[2] "Parents Reactions to Educational Innovations," Gallup International, Inc., Princeton, N.J., May 10, 1964, p.54.

There are innumerable types of hierarchial teams (Brownell and Taylor, 1962), but the advantages may be considered by thinking of a team consisting of a master teacher (experienced and outstanding) serving as team leader, two other teachers, one new and one experienced, and a clerical aide.

Role specialization may be employed, in whole or in part. A master teacher may be placed in the most strategic roles, thereby, having great influence because of the large group of students assigned. Conversely, there is no discrimination against a student who might otherwise have been assigned exclusively to a class with an experienced, less skilled, or even incompetent teacher (Clement, 1962). Gilberts (1961) claims that teachers need functional status in an organization: a hierarchial team provides for this. A leadership role is provided to which regular teachers may aspire. In turn, the aide may be stimulated to seek certification for a teaching role (Michael, 1963). Higher morale results from an efficient and satisfying division of labor, and from relief from non-teaching tasks (Clement, 1962). A higher salary for the leadership role is justified and is offset by the lower salary of the non-teaching aide (Anderson, 1960: Clement, 1962).

Although pupils are not as close to one teacher (Clement, 1962), this is offset by the more effective guidance resulting from team consideration of each pupil (Brownell and Taylor, 1962). It is claimed that greater pupil motivation is evidenced by the decrease in the number and intensity of discipline problems. (Bloomenshine, 1959).

Claimed Disadvantages

Only a few disadvantages are hypothesized or reported and, with one exception, are not supported by the reports. The exception is that team members cannot be willingly recruited into teams (Gilberts, 1961). It is thus apparently not possible to build teams from all teachers currently employed on a faculty.

These other disadvantages noted in the literature might be more appropriately described as administrative problems:

1. Scheduling team classes.
2. Finding teachers who can function harmoniously in a team.
3. Disruption of existing grade level and departmental organizations.
4. Locating and training non-teaching aides.[3]

Experimentation

With the exceptions to be noted here, there is a conspicuous absence of controlled experiments on team teaching. In spite of this, increased budgets, building modifications, and new construction specifically designed to permit team teaching have been strongly recommended with little apparent concern for the lack of real evidence in support of its claimed advantages (Anderson and Mitchell, 1960).

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[3] Brownell and Taylor, *op. cit.*, p. 152.

Beasley (1962) divided students in U. S. History into team-taught and conventional classes and found no significant differences in achievement, measured as gain on a standardized test. He found agreement, between students and teachers, that discipline, motivation, and skill in independent study were more highly developed in team-taught groups.

White (1963 and 1964), with Pella and Poulos (1963) made a controlled evaluation of team teaching in biology. Using 440 biology students in Wausau High School, Wisconsin, they assigned half to conventional classes and half to team-taught classes. No significant differences in achievement were found between the two teaching patterns. The team staff felt that they had improved as teachers as a result of the team experience and favored its continuation.

Summary

From a theoretical standpoint, the claims of the proponents of team teaching seem sound. The advantages to teachers, to administrators, and to students, should result in better instruction and should be reflected in higher achievement by pupils. But these claims had not yet been conclusively demonstrated.

Team teaching seems to have been accepted on other than empirical evidence that is better for students. There remained the problem of determining whether or not students might be expected to achieve higher when the team approach is used. The basis purpose of this study was to determine whether or not either pattern of instruction would produce higher measurable achievement.

CHAPTER III

EXPERIMENTAL DESIGN

Purpose

The basic purpose was to determine which pattern of instruction produced greater achievement in high school biology as measured by:

1. The New York State Regents examinations in biology administered at the end of the course.
2. Five locally developed unit tests administered during the course.
3. Nelson Biology Test administered nine months after completion of the course.

Hypotheses

The following null hypotheses were investigated:

1. There is no difference in adjusted achievement between experimental and control groups as measured by the New York State Regents examinations in biology.
2. There is no difference in adjusted achievement between experimental and control groups as measured by gross scores on each of five unit tests in biology.
3. There is no difference in adjusted achievement between treatment groups when sex is an independent variable and the following are used as dependent variables:

   - a. Raw score on the Regents examinations in biology.
   - b. Raw scores on each of five unit tests in biology.

4. There is no difference in adjusted achievement between males and females when subjects from both treatment groups are grouped together, as measured by the following dependent variables:
   - a. Raw score on the Regents examinations in biology.
   - b. Raw scores on each of five unit tests in biology.
5. There is no difference in adjusted achievement between treatment groups as measured by the Nelson Biology test administered nine months after completion of the biology course.

Definitions

The following definitions applied in this study:

Team Teaching - a teaching situation which is structured through the cooperative efforts of two, or three teachers, each of whom is a qualified, certified teacher. It is further defined by the activities of the teaching team and these restrictions:

1. The team is responsible as a team for an experimental group of students, relative to these and related activities:

Planning	Scheduling
Instruction	Discipline
Testing	Counseling
Grading	Parent relations

2. The team-taught (experimental) group meets at least forty times per year in groups no larger than

one-third of the total.

3. The teaching team meets once daily for planning purposes and related team activities, and also meets for a two-week summer planning session prior to each of the two experimental years.

Conventional Instruction - a teaching situation which is structured through the efforts of a single, qualified, certified teacher and dealing with a group of students no larger than one-third (for three-teacher teams) or one-half (for two-teacher teams) of the experimental group.

Biology Pretest - a test designed to measure previous knowledge in biology, constructed cooperatively by participating teachers and a university research team.

Unit Test - One of five tests on instructional units from the New York State Regents Syllabi in Biology, prepared cooperatively by all participating teachers and consultants and designed to measure academic achievement on that unit.

Subjects

The subjects were tenth grade students enrolled in the Regents biology course. In most schools the Regents course is the one taken by students in a college entrance program and is also taken by any others capable of seeking school credit for a "regular" biology course. Talented students take this course prior to any specialized course. Only slow-learners with very little chance of pursuing post high school studies do not take the Regents course. Such students will take courses described variously as Life Science, Basic Biology, Health or Biology II.

Treatment Groups

Treatment Groups were formed at the end of the academic year preceding each experimental year. In each school all ninth grade pupils designated by school personnel to study Regents biology in the tenth grade were listed alphabetically. The students were then randomly assigned to one of two treatment groups: Control (Conventional) or Experimental (Team Taught).

Final assignments varied from the random for several reasons. Strong parent or pupil objection and counsellor opinion accounted for a few changes. Scheduling problems with other school courses accounted for some. While the randomization process probably equated the two groups quite well, assignment changes precluded an analysis by simple comparison.

Instruments

The following battery of tests was given in September of the academic year:

1. School and College Ability Test Form 2A.
2. Sequential Tests of Educational Progress:
   Reading Form 2A and Science Form 2A.
3. Biology Pretest Form J, a test cooperatively developed by project teachers and consultants.

The following unit tests, also cooperatively developed, were given in each school at the conclusion of instruction in that unit as provided for in the local calendar of instruction: Plants, Cell Physiology, Body Systems, Genetics, and Evolution, all Form Z.[1]

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[1] Development of the unit tests and of the Biology Pretest is described in Chapter IV.

The state Regents examinations in biology were given in June at the end of the academic year and the Nelson Biology Test was given in March, nine months following completion of the course.

Controls

1. Each teacher served as his own control by teaching both with a team and in the conventional situation.
2. Hawthorne effects were minimized by operating the project over a three-year period. The initial year was used for planning and developing the teacher-made tests. The second year was used as a trial run and included data collections. This report is based on data collected in the third year.
3. To control for lack of random assignment to treatment groups, the data were treated by the analysis of covariance technique.
4. Differences between schools were not controlled. This was not necessary because data from each school were treated separately.[3]

Analyses

Combined data from all schools was analyzed. In addition, separate analyses were made for each school. Ten one-way analyses of covariance were made using scores onthe pre-test battery as the covariables and the following as dependent variables:

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[3] Combined data from all schools was however analyzed and is shown in Appendix B.

1. Raw scores on the Regents examination.
2. Raw scores on each of the five unit tests.
3. Raw scores on the Nelson Biology Test.

Significance was tested at the .01 level and at the .05 level.

Limitations

Conclusions based upon the results of this study must take into account the following limitations:

1. Only schools in the greater Rochester metropolitan area were used.
2. Only schools large enough to employ at least two biology teachers were used.
3. Only tenth-grade pupils were used as subjects.
4. Only the New York State Regents syllabi was used.
5. Only two or three member teams of peers were used. Team leaders were not designated nor were aides employed.
6. Participating schools may be considered to be above average in research orientation and in tendency to innovate.

CHAPTER IV

PROCEDURES

The Project

The project was proposed by a university team consisting of a science education and curriculum specialist, a research and testing specialist, and a graduate research assistant. A proposal was presented to the eight school districts in the greater Rochester metropolitan area. Contact between the team and the schools was made through the office of the assistant district superintendent of one of the districts. He was a person very interested in doing educational research and also possessed those leadership skills necessary to coordinate a multi-district project. He suggested working through the Genesee Valley School Development Association, a group to which all the school districts belonged.

Exploratory meetings were held in the spring of 1964. These were attended by the executive secretary of the school development association, the university research team, and the teachers, department heads, principals, and superintendents of the invited schools. Sufficient genuine interest was expressed to continue. It became apparent however that a study of the scope proposed would involve large investments of time, and of leadership and research talent, and that to be successful, should be adequately financed. While the involved districts were not financially impoverished, for the purpose of funding research, they might just as well have been. All were feeling the pinch of rising enrollments, increased costs and the consequent rising tax rate. In spite of the desirability of establishing a research budget, no district felt it could do so. Most were, however, willing and able to assume any costs that could be carried in existing budget categories.

It was suggested that state funds for educational research recently appropriated by the legislature might be available. A multi-district proposal was drafted and submitted by the school development association to the Office of Education Research of the State Education Department. The proposal was favorably received and adequate financing was assured on a continuing contract basis. One of the better features of the approved contract was a budget item to pay the classroom teachers for the extra time required of them for the research.

It was decided to run the study over a three-year period in order to provide time: (1) to reduce Hawthorne effects, (2) to develop the locally-made tests, (3) for each teaching team to evolve a particular style and procedures peculiar to it, (4) for each teacher to develop needed expertise with new techniques and procedures, and (5) to refine data collection procedures.

The first year would be primarily for planning and test development. The second year would be for a trial run and would also include data collection. Data for analyses would be collected in the third year. It was anticipated that a fourth year would be needed for data analysis.

It was also planned to hold monthly meetings of the research team and the cooperating teachers. These would be used to carry out the project activities of planning for team teaching, test development, and data collection. In the final year audio tapes would be made of teacher discussions and it was hoped that these would indicate, together with questionnaires and subjective observations, the essential differences between the conventional and the team approaches.

The Schools

Six high schools in six of the eight invited districts decided to participate. Except for one smaller school in a suburban district, all were similar in size. One was a city school. Four others were single high schools serving suburban districts and one of these was the smaller school. The sixth school was the newest of two high schools in a rapidly growing district. The schools were designated as follows:

School A: a high school serving an old established suburb

School B: suburban high school in a middle class district of modest growth

School C: smaller high school in a suburban village of no growth

School D: newest of two high schools in a large suburb of rapid growth

School E: city high school

School F: a grade 10-12 high school in a rapidly growing middle-class suburb, formerly a rural school for grades K-12.

The Teaching Teams

In each school the team was comprised of those teachers assigned to teach biology exclusively. There were five three-member teams and one two-member team. Except for the team in school D that included the science department head, all teams were composed of peers. Except for the smaller team C composed only of two female teachers, each other team had at least one member of each sex. Of the total of seventeen teachers, nine were female. In the first year of the project all teachers were fully licensed and on tenure. Over the life of the project schools A, B, and E had no personnel changes. School C had a change at the end of the initial planning year and schools D and F at the beginning of the final year.

Except for the restrictions imposed by the study, team structure and operation were allowed to develop as needed in each school setting. Clerical and laboratory aides were not employed but neither were they prohibited by the research design.

None of the schools had what would be described as special team teaching facilities. All had a room where the entire team-taught group could meet. Schools B and D used the school auditorium, school F the cafeteria, and schools A and E double-length classrooms with arm-chair desks. School C used a specially designed lecture room with centrally controlled lighting and audio-visual equipment. Three of the schools, (B, C, and D), had sufficient flexibility to be able to schedule either large group or small group sessions during the team period. The others did not, and were restricted to more rigid schedules. The variety of daily schedules is illustrated in Table 1.

Courses of Study

Each school had its own course of study reflecting local conditions, needs, and interests, but in each case it was based

TABLE 1

DAILY SCHEDULES OF CLASSES BY SCHOOL

School Period	A	B	C	D	E	F
1		TEAM	Control A	Planning	Planning	TEAM
2	Control B	Planning		TEAM	Control C	Planning
3	TEAM	Control C			Control B	Control C
4			TEAM	Control C		Control A
5	Control C	Control B			TEAM	Control B
6	Control A		Planning		Control A	
7			Control B	Control A and B		
8	Planning	Control A				

Note: Control A, B, and C refer to conventional classes of team members A, B, and C in each particular school.

upon a state Regents syllabus. During the project there were two Regents syllabi in use and two examinations were prepared and given. The 1958 edition of the Biology syllabus was used in schools B, C, and E, the revised 1966 experimental edition in the other schools.

Similarities in the courses of study are reflected in unit test titles. Differences in emphasis and content tended to lie outside these topics. For example, the first draft of the Evolution test was called Evolution and Ecology, but ecology was not common enough to all courses of study and questions on that subject were subsequently eliminated.

Development of the Tests

The cooperative development of the locally produced Biology Pretest and the five unit tests was a major project activity, and a considerable amount of time during the planning year was devoted to it. Most of the work was done at the monthly meetings of the university research team and all project teachers. These were held on a Monday from four to six in the afternoon at the various schools.

The test development was basically an attempt to provide needed criteria and at the same time to overcome some of the barriers to the production of sound achievement tests by classroom teachers. Commercial tests, while technically sound, are usually too general to have high content validity for local curricular goals. The opposite is true of the teacher-made tests: they're specific to the curriculum but can't be rated high in such desirable technical traits as adequacy, objectivity, economy, and reliability.

The Unit Tests

The object was to develop tests that would measure academic achievement with respect to selected areas of the Regents syllabus as that syllabus was interpreted by the project teachers in the six local high schools. Five units were mutually agreed upon by the seventeen teachers as being common to their several courses of study. The procedure described here was followed for all unit tests.

The first step was to prepare a table of specifications. This was a list of topics for each unit with percentages that would indicate the relative numbers of items that should appear on the test.

Each teacher prepared a list of topics and listed the number of days spent in teaching each. Each team then prepared a three-column table. In column one they listed topics, in column two the average number of days spent teaching the topics, and in column three a percentage that indicated the relative importance of the topics as compared to the unit. This percentage was an expression of the ratio of days per topic to days per unit, modified by the importance of that topic apart from the time required to teach it.

At the next meeting a composite table for all schools was prepared. A common list of topics was discussed and agreed upon, the percentages adjusted and the range and averages for all schools listed. This became the guideline for construction of the test.

It was mutually agreed that for ease of scoring, for purposes of statistical treatment of the test results, and in keeping with the format of the Regents exam, that the test questions would be multiple-choice with four responses per item. This would also permit use of standard answer sheets.

It was further agreed that an attempt would be made to get a distribution of item types across Bloom's cognitive categories (Bloom, 1956). After studying the submitted test items, a simplified four-category classification scheme was devised and subsequently all test items were placed into one of the following categories: (1) Knowledge, (2) Comprehension, (3) Application, (4) Higher competencies: Analysis, Synthesis and Evaluation. These were defined as follows:

Knowledge - the recall of specific and isolated bits of information.

Comprehension - the ability to recognize and make use of information and if necessary to put it into other terms: the ability to pick out the essential parts of a statement.

Application - the ability to choose from several facts or ideas only those necessary to the solution of the problem at hand, and to use them in the solution.

Higher Orders: Analysis, Synthesis and Evaluation:

Analysis - the ability to reduce a problem to its simplest components to detect any relationship between them and further to determine if those relationships are true or false, logical or illogical: the ability to reason inductively.

Synthesis - the ability to reach a conclusion or solve a problem by logically combining or rearranging the elements of the problem; the ability to reason deductively.

Evaluation - the ability to compare facts or ideas with a given or assumed standard and decide if those facts are "useful" or not, or "good" or "bad"; the ability to pass judgment based upon a standard.

Each teacher then submitted about fifteen questions to his own team. The duplicates were eliminated and the remaining questions were submitted as written (on cards or listed on sheets) to that team that had previously been assigned to perform the secondary screening for that particular unit. One team had previously worked on the Pretest and this left one unit test per team.

The team in charge screened all items for duplicates, made minor changes to improve the mechanical appearance or wording of items, and then listed them in groups by topic from the table of specifications. The research assistant then prepared a draft of the test using all submitted items but placing the simpler and easier questions at the beginning of the test and the higher orders at the end. Each test contained between 164 and 214 items.

At the next monthly meeting each teacher screened every item using a special form prepared for that purpose, that essentially sought the answers to the following questions:

(1) Is the question appropriate to that unit? (2) Is the question of appropriate difficulty for the average-to-better students? (3) Is the question mechanically okay? (Is there a correct response? Is there only one best response? Is the item properly worded? Are all words correctly spelled? Is it ambiguous or misleading in any way?) (4) Should the item be discarded or can its mechanical deficiencies be corrected? (5) Into which cognitive category should it be classified?

Using these teacher reports and all items that passed the screening or that could be salvaged by correcting deficiencies, and also using the table of specifications, the research assistant then made up two forms of each test. While the number of items on each of the two forms of a test was approximately equal, the total number for both forms ranged from 100 for the Genetics test to 132 for the Evolution test. Copies were mailed to each team for proofreading. These initial forms were then printed and copies distributed to all schools, for administration in all regular (conventional) classes of the project teachers. Administration was at the conclusion of study of a unit or as soon thereafter as the tests became available. Both forms were given at random in each class.

Problems in test administration were noted by the teachers, and answer sheets were returned to the university team for analysis. The field testing indicated that about forty-five seconds per item was required and that a final form of forty to fifty items would be appropriate in length.

Tests were scored with an IBM 1230 Optical Scanner, permitting the direct recording of item responses, as well as total scores, on punched cards. The punched output was then converted to item-response replicas by a utility computer program and were in turn analyzed to provide the bases for item ordering and revision.

The determinant of the adequacy of correct responses and foils (incorrect responses) was the biserial coefficient of correlation between each alternative response, both correct and incorrect, and total score on the test, less the influence of the item in question.

Under the scheme used here, the ideal test item would be one for which the response keyed as correct had a high, positive correlation with total score, and the foils had substantial and nearly equal _negative_ correlation with the same criterion. As might be expected, there were few items that satisfied these standards. Low positive (or a negative) correlation for keyed correct response, _or_ low negative (or a positive) correlation for any foil, was considered sufficient cause to review the item in question. In general, unless the difficulty was readily apparent in the wording of either the item stem or the keyed response, a correlation of less than +0.20 between total score and keyed response was cause for elimination of an item from further consideration. Similarly, when one of the item foils showed a correlation _greater than_ -0.20 with total score, that particular foil was examined with a view to foil-revision, but when more than one foil proved questionable, the item was usually eliminated.

Item difficulty was determined with another utility program, which simply counted the number of individuals electing each alternative response (or no response) and divided each sum by the total number of subjects tested. Items which were answered correctly by fewer than twenty per cent or more than ninety per cent of the biology pupils were discarded, as were those which more than ten per cent failed to answer.

Items that survived these tests of discrimination and difficulty were retained for the revised forms, again with guidance from the topical distribution requirements of the tables of specifications. An overall difficulty level of about 0.6 (an average of sixty per cent passing all items on a particular test) was desired, and items were shifted between alternate forms to achieve difficulty equivalence. Because an average score of sixty per cent made the teachers and students uncomfortable, it was necessary to develop a curving equation which scaled the mean to eighty per cent.

Based on information from the analysis just described, and with the assistance of the research team, revised forms of the tests were produced by the team previously assigned to each test. Items that had survived the tests of discrimination and difficulty were listed in order of difficulty according to topic and were keyed by cognitive category. With these two guidelines of difficulty and cognitive category, and using the table of specifications to determine how many items should be drawn from each topic, two revised forms of forty items each were produced. These were edited by the research assistant and minor changes to improve readability and usability were made. All tests were proofread by all teachers and necessary changes made before printing. These were distributed with directions and answer sheets and both forms were given at random to both treatment groups at the end of study in that unit.

These revised forms were subjected to the same statistical analysis. This process, together with a severe subjective screening of each item, reduced the pool of items available for each test below the number required for two forms. A final single form of each test was then produced using roughly the same procedure as described above. These tests were designated Form Z and were the ones used during the year of the project upon which this report is based.

The Biology Pretest. Development of the Biology Pretest was somewhat similar. The object was to develop a test that would measure academic achievement in biology up to the time a pupil enrolled in the high school biology course. This test was needed for field testing during the first week of the 1964-65 school year and it was therefore necessary to develop it during the spring and summer of 1964. Team D was available to work on it and was assigned this task.

During June all project teachers were asked to submit what they considered to be the best twenty questions of the multiple-choice type from past teacher-made unit tests or final examinations. They were also asked to submit questions from all topics and to convert good questions not of the multiple-choice type to that type.

Team D screened the items and grouped them by units using the major Regents syllabus topics. Using the syllabus topics and the cognitive categories as guidelines, two forms of the test, one of fifty-two items, the other of fifty-six were made up by the university team and Team D working together. These were given to all classes (all conventional the first year) of project teachers.

After item analysis and validation in a manner similar to the unit tests a single form of fifty-six items was produced. This same Form J was used in both data collection years.

Data Collection

Biology Pretest. This was given in all schools in a regular class period during the first week of school. Uniform instructions and standardized answer sheets were provided to all schools.

Standardized Tests. These were given in all schools during the one-month period from September 28th through October 24th, according to a master schedule worked out at the first monthly group meeting. Instructions, numbered test booklets, and commercial answer sheets were delivered in a box the day before they were required. Teachers were in charge of the test administration, and in most cases the tests were given during regular class periods. In other cases double class periods were set aside as permitted by the general guidelines. Answer sheets were alphabetized and returned with the tests.

Unit Tests. These were given under conditions appropriate to each school. Uniform instructions were, however, prepared and were delivered with the required answer sheets.

In each school they were given at the conclusion of study of that unit. Both experimental and control classes took a given test within the same seven-day period. Most teachers scored the tests manually in order to obtain an immediate score for grading purposes.

For experimental purposes the answer sheets were machine scored. An answer key was prepared by the team in charge of that test and then approved by all teachers at a subsequent meeting.

Regents Examination. These examinations are given under specified conditions at a time and date that is uniform throughout the whole state.

For the year of this report, two syllabi were in effect and two examinations were prepared and given. One of these syllabi was a revised edition and was being tried out. It was used by schools A, D, and F.

An answer key is supplied with the test copies and the tests are teacher scored. Their results are subject to review by the Bureau of Examinations of the State Education Department.

For purposes of this study each teacher submitted a list of students and grades. Actually the grades were entered on a master list that had been prepared at the beginning of the year. This list indicated the random assignment to treatment group, the actual assignment to treatment group, the sex, and the grade level of each student.

CHAPTER V

RESULTS

Treatment of Data

Separate analyses were made for each school. Ten one-way analyses of covariance were made using scores on the following as covariables:

1. Biology Pretest Form J,
2. School and College Ability Test Form 2A,
3. Sequential Tests of Educational Progress: Science Form 2A and Reading Form 2A,

sex and treatment as independent variables and the following as dependent variables:

1. For schools B, C, and E: raw score on the June 21, 1967 Regents High School Examination in Biology.
2. For schools A, D, and F: raw score on the June 21, 1967 Regents Experimental Examination in Biology.
3. Raw scores on each of the five unit tests in biology:
    a. Plants Form Z
    b. Cell Physiology Form Z
    c. Body Systems Form Z
    d. Genetics Form Z
    e. Evolution Form Z
4. Raw scores on the Nelson Biology Test.

The analyses were done on an IBM Model 360 Computer.

Analyses were performed using the standard program, COVAR, adopted at the Boston College Computing Center from the program presented in Cooley and Lohnes , Multivariate Statistics for the Behavioral Sciences, John Wiley, 1965.

Summary of Results

Results of the analyses are shown in Tables 4 through 39 in Appendix A and are summarized and reported below. Combined data for all schools is reported in Appendix B. Significance was tested at both the .01 and .05 levels and differences at or above the .05 level are reported here by hypothesis.

Hypothesis 1. There is no difference in adjusted achievement between experimental and control groups as measured by the New York State Regents Examinations in biology. Accepted in schools A, B, C, D, and E. Rejected in School F.

Hypothesis 2. There is no difference in adjusted achievement between experimental and control groups as measured by raw scores on each of five unit tests in biology.

Accepted in schools A, B, C, and E. Rejected in schools D and F. School D showed a difference in support of the conventional group on the Body Systems Test. School F showed a difference in support of the team-taught group on the Plants, Body Systems and Genetics tests.

Hypothesis 3. There is no difference in adjusted achievement between treatment groups when sex is an independent variable and the following are used as dependent variables:

a. Raw score on the Regents examinations in biology.

b. Raw scores on each of five unit tests in biology.

Hypothesis 3. Part a. Accepted in schools A, B, C, D, and E. Rejected in school F, with a difference in support of team-taught males.

Hypothesis 3. Part b. Accepted in schools A, C, and E. Rejected in schools B, D, and F. Differences occurred on two of the unit tests and are reported below by test:

Plants test:

Conventional males, School B

Team males, School F

Body System Test:

Team females, School B

Conventional females, School D

Hypothesis 4. There is no difference in adjusted achievement between males and females when subjects from both treatment groups are considered together, as measured by the following dependent variables:

a. Raw score on the Regents examinations in biology.

b. Raw scores on each of five unit tests in biology.

Hypothesis 4. Part a. Accepted in schools A, C, D, E, and F. Rejected in school B with a difference in support of the females.

Hypothesis 4. Part b. Accepted in schools A and C. Rejected in schools B, D, E, and F. All differences were in favor of the females and are reported below by unit tests:

Plants, School D

Cell Physiology, School E

Body Systems, School B

Genetics, Schools B and F

Hypothesis 5. Accepted in schools A, B, C, D and E. Rejected in school F with difference in support of the team-taught group.

Table 2 summarizes significant differences by school and dependent variable.

The results indicate that the experimental group achieved significantly higher in school F. This team-taught group achieved higher on every dependent variable but not significantly so on the Cell Physiology and Evolution tests.

In School D the conventional group achieved significantly higher on the Body Systems test. Conventional females also achieved significantly higher than the team-taught females on the same test.

In School B the conventional males achieved significantly higher on the Plants test and the team-taught females significantly higher on the Body Systems test.

Comparisons made between males and females while disregarding treatment group indicate that females achieved significantly higher on several of the variables including the following:

School B: Regents Examination, and Body Systems and Genetics tests.

School D: Plants test.

TABLE 2

SIGNIFICANT DIFFERENCES BY SCHOOL AND DEPENDENT VARIABLE

Test	School A	School B	School C	School D	School E	School F
Regents	-	F	-	-	-	F, Tm
Plants	-	Cm	-	F	-	T, Tm
Cell Physiology	-	-	-	-	F	-
Body Systems	-	Tf, F	-	C, Cf	-	T
Genetics	-	F	-	-	-	T, F
Evolution	-	-	-	-	-	-
Nelson	-	-	-	-	-	T

Entries in the table indicate where significant differences were observed and are keyed as follows:

C = Control (conventional) Group
T = Experimental (team-taught) Group
- = No Significant Difference

m = Male
f = Female
M = All males
F = All Females

School E: Cell Physiology test.

School F: Genetics test.

Discussion of the Results

No significant differences were noted between treatment groups in schools A, C, and E. During the two data collection years these schools had no personnel changes. Of the schools with differences, two of the three had such changes. There appears to be a relationship between lack of teacher turnover and lack of significant differences between treatments. Put another way, the significant differences observed may be attributable at least in part to the uncontrolled variable of teacher replacement. In a broader sense, the success of a particular teaching method, or at least a lack of significant difference between it and another method, may be positively related to an undisturbed school setting. The results of this experiment seem to support this.

In school B the results are contradictory. For each of the two units for which significant differences were obtained, a team member who was the subject matter specialist acted as team leader and large group lecturer. On the Plants test, the team achieved lower, on the Body Systems test, higher. Neither the teacher reports, nor taped discussions between teachers, reveal possible reasons for the differences. In spite of the statistical differences noted, it is difficult to attach much importance to them. An investigation of teacher and pupil attitudes towards the topics in question might reveal possible explanations but these are not to be found in the available information about the team operation or the conventional teaching in school B.

In school D the conventional group achieved higher on the Body Systems test. The teachers' reports indicate that while this unit was cooperatively planned, there was less team teaching activity on this unit than on other units. That is, there were few large group presentations, group laboratories and small group sessions for the experimental group while on this unit. These results emphasize the importance of the team planning session and the possible conclusion that the planning session, coupled with a conventional class setting, might be a superior teaching arrangement than either team teaching as it is currently defined, or the conventional method as it is traditionally employed.

While the results in school F appear to support team teaching, with the subjective information at hand, it is difficult to attribute the differences noted solely to the treatment difference. Rather it is the conclusion of the author that the differences noted might be due to the effects of attrition or to a survival effect similar to the Hawthorne effect.

Table 3 indicates for school F a subject attrition of 52 per cent for both experimental and control groups, and that this was the highest of all schools. While there is no difference in attrition between experimental and control groups, those subjects "lost" (because of incomplete data) may have been those who would have benefited most from either treatment. Put another way, those subjects not lost due to attrition may be those for whom a

TABLE 3

ATTRITION OF SUBJECTS

	Initial Subjects		Data Subjects		Attrition	
School	Team	Conventional	Team	Conventional	Team	Conventional
A	69	69	60	53	13%	23%
B	73	80	46	59	37%	26%
C	39	51	32	47	18%	8%
D	61	61	44	38	28%	38%
E	75	77	50	42	34%	45%
F	61	60	29	29	52%	52%
Total	378	398	261	268	67%	68%
Grand Total	776		529			

difference in treatment has the least effect. The high attrition would thus call into serious question a conclusion that a team method is better when based upon the results in school F.

Taped exchanges and teacher reports from school F indicate that of the six schools, this one had at best, a minimum team operation. Based upon this subjective information, it is the authors' conclusion that the differences noted in favor of the team group are more due to the uncontrolled variable of the experiment itself than to differences in treatment.

There was in this team a minimum of team planning, of special grouping of students, of varying of length of instructional period, and of innovations in general that usually grow out of a team approach. There was a very minimum of experienced leadership. Two of the team members joined the team at the beginning of the year of the study reported here. Both had limited experience and one replaced a team member who, because of experience with the team during the previous year, asked to be reassigned to a conventional situation. The holdover team member with over ten years experience was unable to function as team leader because of his position as president of the teachers association in a year of involved negotiations with the school board over contractual matters. Planning activities had to be handled primarily by the two inexperienced team members. The daily planning session was frequently subverted by activities foreign to the team forcing them to meet as they could after school.

The team was also plagued with mechanical problems due to over-crowding. The large group sessions were locked into the schedule and the group met in the cafeteria where kitchen noise was an interference. Laboratories were very difficult to schedule and impossible to make up.

The administration, while cooperative, was unable, because of other problems, to provide leadership. The school had three different principals over the years of the project. The department head had insufficient unscheduled time to assist the team with administrative problems.

The differences in school F may be due to a compensation of effort on the part of the experimental subjects. Probably for them there was a felt need to survive in a trying situation and this induced a corresponding increase in their efforts to succeed.

The results in school F, while they seem to support the team approach, do not support the basic premises and proposed hypotheses concerning team teaching. An ex post facto study is needed to determine the relationships between the school conditions, the team operation, and the results reported. With the information available from this study it is difficult to conclude that the treatment difference alone produced the differences observed. One might be tempted to conclude that students will achieve higher in a disburbed school setting. It would be more reasonable to conclude that when students assume responsibility for their own academic progress (whether by design or by accident), higher achievement may result.

Conclusions

The experimental results seem to support the preliminary conclusion that precipitated the study: Team teaching seems to have been accepted on bases other than evidence that it results in higher academic achievement. The results also indicate that a conventional method of teaching does not produce higher academic achievement when compared to a team approach.

On the basis of the results of this study, teachers and administrators who wish to employ team teaching for reasons deemed beneficial to them or to students, may do so with some evidence that academic achievement will not be lowered. Conversely, those who prefer the traditional one-teacher, one-classroom approach may defend that position by noting that the team approach has not yet been proven to produce higher academic achievement.

CHAPTER VI

A SUBJECTIVE SUMMARY

During this study, it was possible to observe teaching teams come into being, evolve, mature, and then renew themselves or atrophy. But one may observe such a process, be able to describe it, and yet not be able to explain why it happened. The number of variables present in a school setting, and within a team, and the innumerable interactions between them make it nearly impossible to make statements relating cause and effect.

In spite of this, an attempt was made to obtain a subjective picture of team operations. Discussions between team teachers were tape recorded on two ocassions, once at the end of the 1965-66 school year and again in March 1967. In May of the year of this report a questionnaire was administered to all cooperating teachers.[1] On the basis of this and observations of the research team some subjective observations may be made.

Part C of the questionnaire is included here with the responses tabulated using a key as follows:

Numbers in parentheses refer to number of respondents who marked the item + from a total of 14 respondents.

0 - 1 = -- = substantial negative opinion regarding the item.
2 - 4 = - = negative opinion regarding the item.
5 - 9 = 0 = ambivalence regarding the item.
10-12 = + = positive opinion regarding the item.
13-14 = ++ = substantial positive opinion regarding the item.

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[1] Copy included in Appendix C

PART C

STATEMENTS CONCERNING THE TEAM TEACHING PROJECT

Below are some statements which ask for your opinion about Team Teaching. These statements relate to Team Teaching in general and Team Teaching as it is operated in your school. For each statement, please indicate whether you agree or disagree with it (+ or -). All answers will be treated in strict confidence.

++ (13) Our participation in the Team Teaching Study had sufficient support of the administration.

0 (9) Our team had sufficient planning time.

0 (7) By the time I started team teaching, I had adequate information about it.

0 (8) We expected more supervision from the staff at the University of Rochester.

+ (10) Although we were a teaching team, we still operated somewhat independently from each other.

+ (12) It is important for team members to be congruent.

+ (10) Our team organization allowed us to take advantage of the interests and special skills of the individual members.

0 (9) It is necessary for a team to have a leader.

++ (14) There is probably more innovative potential in Team Teaching than we realized.

- (4) Team Teaching is much better for the inexperienced teacher than for the experienced teacher.

0 (6) The students that participated in the Team Teaching Study were sufficiently informed about this method.

0 (9) Team Teaching is probably a better method for the above-average student only.

0 (9) Team Teaching allows students to be more independent.

0 (7) If used properly, Team Teaching is suitable to all students.

- (2) Team Teaching allows students to develop critical thinking.

++ (13) There are certain skills which students need to learn if they are to participate successfully in Team Teaching.

--	(0)	Our team planning sessions included teachers who were not part of the team.
0	(7)	Our experience was characterized by the lack of a team effort.
++	(14)	Some teachers are better suited for Team Teaching than others.
0	(5)	Probably any teacher can be trained to work in a team situation.
0	(9)	Team Teaching in our school was hampered by a lack of physical facilities.
+	(12)	My participation in Team Teaching helped me in my conventional classes.
++	(13)	I would like to have more experience with Team Teaching.
++	(14)	Students who participate in Team Teaching should receive training in note-taking.
--	(1)	Team Teaching provided me with an opportunity to become better acquainted with individual students.
0	(8)	Tenth graders are probably ready for Team Teaching.
+	(10)	Our team probably could have done a better job of preparing the students.
0	(8)	Our second year int he Team Teaching Study was much better than the first year.
-	(3)	Team Teaching places too many constraints on how a teacher teaches.
++	(14)	Sharing of duties is an important feature of Team Teaching.
++	(14)	Teacher interaction in the form of discussions is an important feature of Team Teaching.
-	(4)	Our team rarely had an opportunity to discuss ideas and problems.
++	(13)	Evaluation by the other team members is an invaluable feature of Team Teaching.
--	(1)	Our team members rarely had an opportunity to observe one another.
0	(6)	Even though we had the opportunity, our team rarely discussed ideas and problems.

-- (1) Even though we had the opportunity, our team members rarely observed one another.

0 (7) A team leader is necessary to coordinate the activities of the team.

0 (8) Student selection is crucial for the success of Team Teaching.

++ (13) I feel that the exchange of information with teams in other schools was valuable.

+ (11) The exchange of information with teams from other schools was an excellent learning experience.

++ (13) Students did not feel free to raise questions during the lecture sessions.

-- (0) During the lecture sessions we encouraged student participation.

+ (11) Team Teaching provides the teacher with a greater degree of professional responsibility than do conventional methods.

0 (5) I don't really see how Team Teaching can improve the student's learning experience.

+ (11) Participating in an experimental study, such as Team Teaching, most often results in improved teacher performance.

The following statements summarize the results of the whole questionnaire and the subjective observations of the research team and the consultant in educational sociology.

Team Teaching:

1. Requires more planning time, (which is also provided by the method), is more work, is a greater challenge to students and teachers, and leaves teachers at least as physically and emotionally tired, and oftimes more so, than does conventional teaching.

2. Makes better use of the behavioral skills and subject matter talents of teachers.

3. Develops leadership talents useful to the team, beneficial to students, but not necessarily helpful to administrators.

4. Is a better way to induct new teachers into a faculty, and is a better way to train interns because they:

   a. can observe a variety of teaching approaches
   b. benefit from several points of view and the criticism of other team members.
   c. can concentrate their practice in the several behavioral roles of teachers.

5. Is not better for the inexperienced teacher (as compared to the experienced teacher) and is not more easily adapted to by new teachers.

6. Stimulates, and in some instances requires, teachers to be more up-to-date in knowledge of subject matter, curriculum, and methods of teaching.

7. Does not result in greater student enthusiasm or interest but may induce better individual study habits.

8. Easily identifies superior students but does not easily identify students with learning difficulties. Teachers do not become well acquainted with students.

9. Permits grouping and re-grouping of students and variation in class size according to need but does not easily permit a variety of teaching techniques to be used in one period or in one day.

10. Provides for less teacher-pupil interaction than a conventional method.

11. Substantially reduces discipline problems.

12. Results in tests that are more uniform and possibly, but not necessarily, more fair, valid and reliable.

13. May work best for those in the 50th to 90th percentile and is not recommended in those in the 30th percentile or below.

14. Results in improved guidance because of pooled information about students and also provides time and opportunity to give special help.

15. Permits more innovative potential than can be realized.

16. Makes it easier to identify, and makes more efficient and effective use of:

a. Audio-visual materials and equipment.

b. Outside specialists and speakers.

c. Field trips.

d. Community resources.

17. Builds an organization to foster continuity from year to year in spite of personnel changes.

18. Requires the support of the school administration but does not require the services of the department chairman.

Team teaching seems to have characteristics that make it different from a conventional approach but these seem to have a greater effect (BOTH positively and negatively) on teachers than on students.

The teachers' subjective reports indicate that it is important for team members to be congruent. Professional and personal compatability are also essential to some minimum degree, but there appears also to be a maximum that may inhibit the candor and criticism necessary to improve the team and to permit it to adapt as a unit to changing conditions. Not all teachers can adapt to a team. And this is a function not of experience and training but of basic personality. The process of socialization that team members undergo demands an adaptability not required of those in the conventional situation.

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APPENDIX A

TABLE 4

SCHOOL A

ANALYSIS OF COVARIANCE WITH THE JUNE, 1967, REGENTS EXAMINATION IN BIOLOGY AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	60	75.1500	10.6769	75.5210	0.0053580
Conventional Pupils	53	76.0755	9.7070	75.6554	NS
Team Taught Females	25	74.3600	9.9537	74.8182	0.0119772
Conventional Females	24	75.5000	9.5143	75.0226	NS
Team Taught Males	35	75.7143	11.2736	76.2854	0.0435582
Conventional Males	29	76.5517	10.0057	75.8624	NS
All Female Pupils	49	74.9184	9.6563	76.4988	1.0523748
All Male Pupils	64	76.0937	10.6425	74.8837	NS
TOTAL SAMPLE	113	75.5841	10.1987		

TABLE 5

SCHOOL A

ANALYSIS OF COVARIANCE WITH SCORES ON THE UNIT TEST COVERING PLANTS AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	60	28.1000	4.8247	28.1419	0.0326556
Conventional Pupils	53	28.3396	4.9882	28.2921	NS
Team Taught Females	25	27.7600	4.1461	27.9671	0.0000000
Conventional Females	24	28.1667	5.5299	27.9509	NS
Team Taught Males	35	28.3428	5.2856	28.4142	0.0001631
Conventional Males	29	28.4828	4.5874	28.3966	NS
All Female Pupils	49	27.9592	4.8389	28.3020	0.0260812
All Male Pupils	64	28.4062	4.9432	28.1438	NS
TOTAL SAMPLE	113	28.2124	4.8816		

TABLE 6

SCHOOL A

ANALYSIS OF COVARIANCE WITH SCORES ON THE UNIT TEST COVERING CELL PHYSIOLOGY AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	60	25.2333	4.9141	25.3065	0.0239573
Conventional Pupils	53	25.5094	4.6352	25.4266	NS
Team Taught Females	25	23.8400	4.9471	23.7829	0.9759149
Conventional Females	24	24.9583	5.0258	25.0178	NS
Team Taught Males	35	26.2286	4.7097	26.3528	0.3355678
Conventional Males	29	25.9655	4.3217	25.8156	NS
All Female Pupils	49	24.3877	4.9658	25.1629	0.1684485
All Male Pupils	64	26.1094	4.5044	25.5159	NS
TOTAL SAMPLE:	113	25.3628	4.7661		

TABLE 7

SCHOOL A

ANALYSIS OF COVARIANCE WITH SCORES ON THE UNIT TEST COVERING BODY SYSTEMS AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	60	25.4167	5.0933	25.6195	0.1273486
Conventional Pupils	53	26.1321	5.6468	25.9024	NS
Team Taught Females	25	25.6000	5.2042	25.7408	0.0656212
Conventional Females	24	25.5417	6.1713	25.3950	NS
Team Taught Males	35	25.2857	5.0850	25.5417	0.7253264
Conventional Males	29	26.6207	5.2332	26.3117	NS
All Female Pupils	49	25.5714	5.6384	26.4486	1.8016920
All Male Pupils	64	25.8906	5.1551	25.2190	NS
TOTAL SAMPLE	113	25.7522	5.3478		

TABLE 8

SCHOOL A

ANALYSIS OF COVARIANCE WITH SCORES ON THE UNIT TEST COVERING GENETICS AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	60	28.5667	6.5182	28.8022	3.5582352
Conventional Pupils	53	30.5283	4.3527	30.2617	NS
Team Taught Females	25	28.0000	7.4330	28.3685	2.4216318
Conventional Females	24	30.7917	4.5776	30.4078	NS
Team Taught Males	35	28.9714	11.2736	29.1516	0.8329986
Conventional Males	29	30.3103	4.2266	30.0929	NS
All Female Pupils	49	29.3673	6.2971	29.9408	0.7680170
All Male Pupils	64	29.5781	5.1879	29.1391	NS
TOTAL SAMPLE	113	29.4867	5.6697		

TABLE 9

SCHOOL A

ANALYSIS OF COVARIANCE WITH SCORES ON THE UNIT TEST COVERING EVOLUTION AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	60	29.2333	4.0058	29.2433	3.5010977 NS
Conventional Pupils	53	30.3396	4.3527	30.3282	
Team Taught Females	25	29.3600	4.3673	29.3644	0.38366992 NS
Conventional Females	24	29.9583	5.0689	29.9537	
Team Taught Males	35	29.1429	3.7896	29.1840	3.6479492 NS
Conventional Males	29	30.6552	3.6672	30.6055	
All Female Pupils	49	29.6531	4.6840	30.3374	2.3038387 NS
All Male Pupils	64	29.8281	3.7820	29.3042	
TOTAL SAMPLE	113	29.7522	4.1780		

TABLE 9-A

SCHOOL A

ANALYSIS OF COVARIANCE WITH SCORES ON THE NELSON BIOLOBY TEST AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO	LEVEL OF SIGNIFICANCE
Team Taught Pupils	37	49.4054	10.6078	49.2448	0.1778298	NS
Conventional Pupils	41	49.6585	8.2481	49.8035		
Team Taught Females	14	48.3571	8.3076	47.8097	0.2008557	NS
Conventional Females	17	48.4118	9.8492	48.8626		
Team Taught Males	23	50.0435	11.9258	50.1627	0.0265202	NS
Conventional Males	24	50.5417	6.9906	50.4274		
Female Pupils	31	48.3871	9.0358	49.2572	0.0833991	NS
Male Pupils	47	50.2979	9.6187	49.7240		
TOTAL SAMPLE	78	49.5385	9.3791			

TABLE 10

SCHOOL B

ANALYSIS OF COVARIANCE WITH THE JUNE, 1967, REGENTS EXAMINATION IN BIOLOGY AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	46	73.8696	10.7344	73.5435	0.0828405
Conventional Pupils	59	73.7288	9.1404	73.9830	NS
Team Taught Females	20	78.0500	9.4730	78.5167	0.6393286
Conventional Females	22	76.9091	10.6634	76.4848	NS
Team Taught Males	26	70.6538	10.6994	69.7749	1.8541069
Conventional Males	37	71.8378	7.6432	72.4554	NS
All Female Pupils	42	77.4525	10.0078	75.7716	4.1893110
All Male Pupils	63	71.3492	8.9680	72.4697	.05
TOTAL SAMPLE	105	73.7905	9.8212		

TABLE 11

SCHOOL B

ANALYSIS OF COVARIANCE WITH SCORES ON THE UNIT TEST COVERING PLANTS AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	46	25.2826	4.9651	25.1577	0.5033544 NS
Conventional Pupils	59	25.6102	4.6201	25.7075	
Team Taught Females	20	27.3000	5.0794	27.5064	0.9704411 NS
Conventional Females	22	26.3182	5.1951	26.1305	
Team Taught Males	26	23.7308	4.3594	23.1921	6.5594358 .05
Conventional Males	37	25.1892	4.2612	25.5677	
All Female Pupils	42	26.7857	5.1016	26.3653	3.1927500 NS
All Male Pupils	63	24.5873	4.3278	24.8676	
TOTAL SAMPLE	105	25.4667	4.7537		

TABLE 12

SCHOOL B

ANALYSIS OF COVARIANCE WITH SCORES ON THE UNIT TEST COVERING CELL PHYSIOLOGY AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	46	22.8913	4.5325	22.8145	0.0964990
Conventional Pupils	59	22.5254	3.8163	22.5853	NS
Team Taught Females	20	23.9500	4.8175	24.3351	1.0234785
Conventional Females	22	23.4091	3.8005	23.0590	NS
Team Taught Males	26	22.0769	4.2135	21.7947	0.1676235
Conventional Males	37	22.0000	3.7786	22.1983	NS
All Female Pupils	42	23.6667	4.2694	23.1512	0.9393541
All Male Pupils	63	22.0317	3.9307	22.3754	NS
TOTAL SAMPLE	105	22.6857	4.1285		

TABLE 13

SCHOOL B

ANALYSIS OF COVARIANCE WITH SCORES ON THE UNIT TEST COVERING BODY SYSTEMS AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	46	23.6304	6.2516	23.4640	1.6574507
Conventional Pupils	59	22.2034	4.3183	22.3331	NS
Team Taught Females	20	25.3500	6.1497	26.1127	5.8771391
Conventional Females	22	23.2727	4.3335	22.5794	.05
Team Taught Males	26	22.3077	6.1173	21.4963	0.3403716
Conventional Males	37	21.5676	4.2396	22.1377	NS
All Female Pupils	42	24.2619	5.3148	24.0756	4.8325844
All Male Pupils	63	21.8730	5.0657	21.9972	.05
TOTAL SAMPLE	105	22.8286	5.2741		

TABLE 14

SCHOOL B

ANALYSIS OF COVARIANCE WITH SCORES ON THE UNIT TEST COVERING GENETICS AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	46	28.0652	6.1116	28.0280	1.0299759
Conventional Pupils	59	27.0339	6.1839	27.0629	NS
Team Taught Females	20	30.1500	5.8244	30.7645	1.7445602
Conventional Females	22	29.2727	5.6752	28.7141	NS
Team Taught Males	26	26.4625	5.9413	25.8698	0.0387861
Conventional Males	37	25.7027	6.1593	26.1185	NS
All Female Pupils	42	29.6905	5.6933	29.1380	7.4743824
All Male Pupils	63	26.0159	6.0335	26.3841	.01
TOTAL SAMPLE	105	27.4857	6.1443		

TABLE 15

SCHOOL B

ANALYSIS OF COVARIANCE WITH SCORES ON THE UNIT TEST COVERING EVOLUTION AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	46	26.7826	3.8292	26.7525	1.9616642
Conventional Pupils	59	25.7458	4.3335	25.7692	NS
Team Taught Females	20	27.6500	4.5800	27.8844	2.8424358
Conventional Females	22	26.0454	4.2255	25.8324	NS
Team Taught Males	26	26.1154	3.0637	25.7817	0.0005875
Conventional Males	37	25.5676	4.4444	25.8020	NS
All Female Pupils	42	26.8095	4.4186	26.1758	0.0022431
All Male Pupils	63	25.7936	3.9151	26.2161	NS
TOTAL SAMPLE	105	26.2000	4.1334		

TABLE 15-A

SCHOOL B

ANALYSIS OF COVARIANCE WITH SCORES ON THE NELSON BIOLOGY TEST AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO	LEVEL OF SIGNIFICANCE
Team Taught Pupils	39	41.6154	9.0804	42.0640	1.0853701	NS
Conventional Pupils	44	44.0000	8.2151	43.6024		
Team Taught Females	18	43.2778	9.9635	45.2109	0.2293226	NS
Conventional Females	15	46.2667	7.7687	43.9469		
Team Taught Males	21	40.1905	8.2257	39.7950	2.8954763	NS
Conventional Males	29	42.8276	8.3241	43.1139		
All Female Pupils	33	44.6364	9.0237	43.2919	0.1647801	NS
All Male Pupils	50	41.7200	8.3031	42.6073		
TOTAL SAMPLE	83	42.8795	8.6622			

TABLE 16

SCHOOL C

ANALYSIS OF COVARIANCE WITH THE JUNE, 1967, REGENTS EXAMINATION IN BIOLOGY AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	32	80.6875	6.2032	78.4137	2.8566561
Conventional Pupils	47	74.2979	7.9699	75.8459	NS
Team Taught Females	15	79.9333	7.3238	78.6602	0.9504287
Conventional Females	20	75.6000	7.4862	76.5548	NS
Team Taught Males	17	81.3529	5.1596	78.7663	2.7073956
Conventional Males	27	73.3333	8.3159	74.9620	NS
All Female Pupils	35	77.4571	7.6248	78.3854	3.0732088
All Male Pupils	44	76.4318	8.2050	75.6934	NS
TOTAL SAMPLE	79	76.8861	7.9195		

TABLE 17

SCHOOL C

ANALYSIS OF COVARIANCE WITH SCORES ON THE UNIT TEST COVERING PLANTS AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	32	25.0625	3.2522	24.1629	2.0144758
Conventional Pupils	47	22.2128	4.4377	22.8252	NS
Team Taught Females	15	24.8000	3.7264	24.2030	0.0504071
Conventional Females	20	23.4500	3.9667	23.8977	NS
Team Taught Males	17	25.2941	2.8672	24.0570	2.3262415
Conventional Males	27	21.2963	4.6145	22.0752	NS
All Female Pupils	35	24.0286	3.8691	24.1792	2.3455524
All Male Pupils	44	22.8409	4.4510	22.7210	NS
TOTAL SAMPLE	79	23.3671	4.2189		

TABLE 18

SCHOOL C

ANALYSIS OF COVARIANCE WITH SCORES ON THE UNIT TEST COVERING CELL PHYSIOLOGY AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	32	25.0312	4.7755	23.9238	1.3479195
Conventional Pupils	47	21.9362	4.5464	22.6902	NS
Team Taught Females	15	24.8667	4.4860	24.2487	0.1950469
Conventional Females	20	23.1000	4.2165	23.5634	NS
Team Taught Males	17	25.1765	5.1507	23.7883	1.2448692
Conventional Males	27	21.0741	4.6652	21.9481	NS
All Female Pupils	35	23.8571	4.3599	24.2317	3.0968390
All Male Pupils	44	22.6591	5.2071	22.3611	NS
TOTAL SAMPLE	79	23.1899	4.8571		

TABLE 19

SCHOOL C

ANALYSIS OF COVARIANCE WITH SCORES ON THE UNIT TEST COVERING BODY SYSTEMS AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	32	23.1250	3.9493	22.4433	0.3197944
Conventional Pupils	47	21.3830	4.6744	21.8471	NS
Team Taught Females	15	22.2667	4.2673	21.6665	0.3646595
Conventional Females	20	20.3000	4.0666	20.7501	NS
Team Taught Males	17	23.8823	3.6035	22.9721	0.0160577
Conventional Males	27	22.1852	5.0003	22.7583	NS
All Female Pupils	35	21.1429	4.2088	21.4166	1.2942152
All Male Pupils	44	22.8409	4.5441	22.6231	NS
TOTAL SAMPLE	79	22.0886	4.4526		

TABLE 20

SCHOOL C

ANALYSIS OF COVARIANCE WITH SCORES ON THE UNIT TEST COVERING GENETICS AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	32	30.1250	5.1353	28.6960	0.0964697
Conventional Pupils	47	27.3404	5.5493	28.3134	NS
Team Taught Females	15	29.4000	4.0497	28.9268	0.7811007
Conventional Females	20	27.2500	5.3986	27.6049	NS
Team Taught Males	17	30.7647	5.9847	28.5546	0.0129876
Conventional Males	27	27.4074	5.7597	28.7989	NS
All Female Pupils	35	28.1714	4.9199	28.3328	0.0375018
All Male Pupils	44	28.7045	6.0100	28.5761	NS
TOTAL SAMPLE	79	28.4684	5.5258		

TABLE 21

SCHOOL C

ANALYSIS OF COVARIANCE WITH SCORES ON THE UNIT TEST COVERING EVOLUTION AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	32	26.4062	3.6883	25.5324	0.0021973
Conventional Pupils	47	24.9787	3.0395	25.5736	NS
Team Taught Females	15	26.1333	4.1381	25.9122	0.0690047
Conventional Females	20	26.0500	2.8373	26.2158	NS
Team Taught Males	17	26.6470	3.3530	25.2538	0.0300041
Conventional Males	27	24.1852	2.9876	25.0624	NS
All Female Pupils	35	26.0857	3.3987	26.0785	1.5657139
All Male Pupils	44	25.1364	3.3243	25.1421	NS
TOTAL SAMPLE	79	25.5570	3.3693		

TABLE 21-A

SCHOOL C

ANALYSIS OF COVARIANCE WITH SCORES ON THE NELSON BIOLOGY TEST AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO	LEVEL OF SIGNIFICANCE
Team Taught Pupils	27	47.1111	7.3293	45.0308	0.6165354	NS
Conventional Pupils	44	42.2045	8.2366	43.4811		
Team Taught Females	12	43.9167	6.6669	42.3271	0.6653036	NS
Conventional Females	20	43.3000	7.6096	44.2537		
Team Taught Males	15	49.6667	7.0068	47.6817	2.3966618	NS
Conventional Males	24	41.2917	8.7798	42.5322		
All Female Pupils	32	43.5312	7.1662	43.3053	0.5058939	NS
All Male Pupils	39	44.5128	9.0434	44.6982		
TOTAL SAMPLE	71	44.0704	8.2086			

TABLE 22

SCHOOL D

ANALYSIS OF COVARIANCE WITH THE JUNE, 1967, REGENTS EXAMINATION IN BIOLOGY AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	44	73.0682	9.5951	73.8001	0.0054363
Conventional Pupils	38	74.5263	10.1629	73.6788	NS
Team Taught Females	20	76.2500	11.0828	76.4687	0.0108969
Conventional Females	11	77.1818	10.6566	76.7842	NS
Team Taught Males	24	70.4167	7.3835	71.5994	0.1544794
Conventional Males	27	73.4444	9.9551	72.3931	NS
All Female Pupils	31	76.5806	10.7635	75.9337	3.4320459
All Male Pupils	51	72.0196	8.8848	72.4128	NS
TOTAL SAMPLE	82	73.7439	9.8280		

TABLE 23

SCHOOL D

ANALYSIS OF COVARIANCE WITH SCORES ON THE UNIT TEST COVERING PLANTS AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	44	17.6591	4.6000	17.8688	2.5968351
Conventional Pupils	38	16.5526	5.6315	16.3098	NS
Team Taught Females	20	20.1500	3.1999	20.2500	0.7233319
Conventional Females	11	19.5454	4.2512	19.3636	NS
Team Taught Males	24	15.5833	4.6055	16.0329	0.6027150
Conventional Males	27	15.3333	5.7312	14.9337	NS
All Female Pupils	31	19.9355	3.5490	19.2760	8.8867435
All Male Pupils	51	15.4510	5.1819	15.8518	.01
TOTAL SAMPLE	82	17.1463	5.1017		

TABLE 24

SCHOOL D

ANALYSIS OF COVARIANCE WITH SCORES ON THE UNIT TEST COVERING CELL PHYSIOLOGY AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	44	20.2954	5.0651	20.5800	0.1713546
Conventional Pupils	38	20.5263	6.1589	20.1967	NS
Team Taught Females	20	22.0000	4.4721	22.0387	0.00557058
Conventional Females	11	22.4545	7.0621	22.3842	NS
Team Taught Males	24	18.8750	5.1778	19.3700	0.0030634
Conventional Males	27	19.7407	5.7083	19.3007	NS
All Female Pupils	31	22.1613	5.4166	21.4400	2.1839685
All Male Pupils	51	19.3333	5.4283	19.7717	NS
TOTAL SAMPLE	82	20.4024	5.5641		

TABLE 25

SCHOOL D

ANALYSIS OF COVARIANCE WITH SCORES ON THE UNIT TEST COVERING BODY SYSTEMS AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	44	16.5454	15.2595	16.7623	6.7270107
Conventional Pupils	38	19.4211	5.8107	19.1699	.05
Team Taught Females	20	18.6500	5.2141	18.7582	5.1880732
Conventional Females	11	22.1818	4.8129	21.9850	.05
Team Taught Males	24	14.7917	4.6902	15.2789	4.0107565
Conventional Males	27	18.2963	5.8823	17.8632	NS
All Female Pupils	31	19.9032	5.2811	18.7991	1.5641851
All Male Pupils	51	16.6470	5.5886	17.3181	NS
TOTAL SAMPLE	82	17.8780	5.6686		

TABLE 26

SCHOOL D

ANALYSIS OF COVARIANCE WITH SCORES ON THE UNIT TEST COVERING GENETICS AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	44	22.3182	6.8634	22.8161	1.6578522
Conventional Pupils	38	24.7895	6.9093	24.2129	NS
Team Taught Females	20	25.2500	6.2397	25.3969	2.3314819
Conventional Females	11	28.0000	7.2388	27.7329	NS
Team Taught Males	24	19.8750	6.4962	20.7097	1.9062996
Conventional Males	27	23.4815	6.4532	22.7395	NS
All Female Pupils	31	26.2258	6.6268	24.9729	3.3564634
All Male Pupils	51	21.7843	6.6613	22.5458	NS
TOTAL SAMPLE	82	23.4634	6.9535		

TABLE 27

SCHOOL D

ANALYSIS OF COVARIANCE WITH SCORES ON THE UNIT TEST COVERING EVOLUTION AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	44	21.8182	3.8596	22.0752	0.0618222
Conventional Pupils	38	22.1316	5.9827	21.8339	NS
Team Taught Females	20	21.60000	3.8987	21.7364	2.3022919
Conventional Females	11	23.8182	6.4934	23.5702	NS
Team Taught Males	24	22.0000	3.9009	22.3064	0.6936226
Conventional Males	27	21.4444	5.7468	21.1721	NS
All Female Pupils	31	22.3871	4.9845	21.5721	0.2784643
All Male Pupils	51	21.7059	4.9246	22.2021	NS
TOTAL SAMPLE	82	21.9634	4.9277		

TABLE 27-A

SCHOOL D

ANALYSIS OF COVARIANCE WITH SCORES ON THE NELSON BIOLOGY TEST AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO	LEVEL OF SIGNIFICANCE
Team Taught Pupils	30	36.1333	8.0931	36.5634	0.4475538	NS
Conventional Pupils	26	38.1923	10.1549	37.6961		
Team Taught Females	17	37.5294	9.3013	38.1968	1.4051657	NS
Conventional Females	9	43.0000	9.6825	41.7394		
Team Taught Males	13	34.3077	6.0468	34.6908	0.1022437	NS
Conventional Males	17	35.6470	9.7143	35.3540		
All Female Pupils	26	39.4231	9.6132	38.1293	0.9422370	NS
All Male Pupils	30	35.0667	8.2250	36.1876		
TOTAL SAMPLE	56	37.0893	9.0820			

TABLE 28

SCHOOL E

ANALYSIS OF COVARIANCE WITH THE JUNE, 1967, REGENTS EXAMINATION IN BIOLOGY AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	50	68.8800	12.5090	71.6102	0.0841042
Conventional Pupils	42	74.3571	14.1884	71.1069	NS
Team Taught Females	28	69.5357	11.5902	71.3835	0.1990880
Conventional Females	16	73.5000	13.8275	70.2663	NS
Team Taught Males	22	68.0454	13.8237	72.1694	0.0991221
Conventional Males	26	74.0846	14.6515	71.3051	NS
All Female Pupils	44	70.9773	12.4406	70.3925	1.2385712
All Male Pupils	48	71.7500	14.5405	72.2860	NS
TOTAL SAMPLE	92	71.3804	13.5085		

TABLE 29

SCHOOL E

ANALYSIS OF COVARIANCE WITH SCORES ON THE UNIT TEST COVERING PLANTS AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	50	26.7400	5.4241	27.7353	3.2566366
Conventional Pupils	42	27.1905	6.6483	26.0056	NS
Team Taught Females	28	27.1429	4.2051	27.4042	0.0624732
Conventional Females	16	27.5000	5.5857	27.0426	NS
Team Taught Males	22	26.2273	6.7396	28.0326	3.6961002
Conventional Males	26	27.0000	7.3267	25.4724	NS
All Female Pupils	44	27.2727	4.6922	27.0000	0.0120800
All Male Pupils	48	26.6458	7.0000	26.8958	NS
TOTAL SAMPLE	92	26.9456	5.9842		

TABLE 30

SCHOOL E

ANALYSIS OF COVARIANCE WITH SCORES ON THE UNIT TEST COVERING CELL PHYSIOLOGY AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	50	20.6800	4.5421	21.5363	0.0514905
Conventional Pupils	42	22.3810	5.1795	21.3615	NS
Team Taught Females	28	22.1071	4.5894	22.6608	0.0126698
Conventional Females	16	23.5000	4.1952	22.5310	NS
Team Taught Males	22	18.8636	3.8582	20.2193	0.1032774
Conventional Males	26	21.6923	5.6694	20.5452	NS
All Female Pupils	44	22.6136	4.4524	22.3131	5.0322809
All Male Pupils	48	20.3958	5.0770	20.6713	.05
TOTAL SAMPLE	92	21.4565	4.8909		

TABLE 31

SCHOOL E

ANALYSIS OF COVARIANCE WITH SCORES ON THE UNIT TEST COVERING BODY SYSTEMS AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	50	21.7000	6.4087	22.6103	0.0131341
Conventional Pupils	42	23.5714	6.0492	22.4877	NS
Team Taught Females	28	22.7500	6.0039	23.1353	0.0000000
Conventional Females	16	23.8125	5.2816	23.1383	NS
Team Taught Males	22	20.3636	6.7932	21.6947	0.1536010
Conventional Males	26	23.4231	6.5737	22.2968	NS
All Female Pupils	44	23.1364	5.7125	23.3034	1.9698353
All Male Pupils	48	22.0208	6.7807	21.8677	NS
TOTAL SAMPLE	92	22.5543	6.2834		

TABLE 32

SCHOOL E

ANALYSIS OF COVARIANCE WITH SCORES ON THE UNIT TEST COVERING GENETICS AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	50	27.4200	6.1870	28.2673	0.0010538
Conventional Pupils	42	29.3095	6.2136	28.3008	NS
Team Taught Females	28	28.1429	6.6149	28.4114	0.9996843
Conventional Females	16	30.8125	5.2816	30.3425	NS
Team Taught Males	22	26.5000	5.6125	27.9817	0.4040500
Conventional Males	26	28.3846	6.6518	27.1308	NS
All Female Pupils	44	29.1136	6.2365	29.0394	1.6307764
All Male Pupils	48	27.5208	6.2057	27.5889	NS
TOTAL SAMPLE	92	28.2826	6.2377		

TABLE 33

SCHOOL E

ANALYSIS OF COVARIANCE WITH SCORES ON THE UNIT TEST COVERING EVOLUTION AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	50	24.8400	4.6658	25.3297	0.6710769
Conventional Pupils	42	26.6429	4.7720	26.0598	NS
Team Taught Females	28	25.0714	3.9993	25.2907	0.0739967
Conventional Females	16	25.3750	3.8275	24.9912	NS
Team Taught Males	22	24.5454	5.4836	25.2595	1.2077494
Conventional Males	26	27.4231	5.2859	26.8186	NS
All Female Pupils	44	25.1818	3.8956	25.1628	1.1465912
All Male Pupils	48	26.1042	5.4626	26.1216	NS
TOTAL SAMPLE	92	25.6630	4.7747		

TABLE 33A
SCHOOL E

ANALYSIS OF COVARIANCE WITH SCORES ON THE NELSON BIOLOGY TEST AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO	LEVEL OF SIGNIFICANCE
Team Taught Pupils	26	41.6154	9.4534	43.3715	0.1795509	NS
Conventional Pupils	22	46.5454	11.6771	44.4700		
Team Taught Females	17	37.8823	13.0139	39.7641	0.2956286	NS
Conventional Females	10	44.4000	7.4714	41.2011		
Team Taught Males	9	43.7778	9.4045	44.7284	0.2708300	NS
Conventional Males	12	48.3333	14.3864	47.6203		
All Female Pupils	27	41.9259	8.9052	43.5554	0.0653115	NS
All Male Pupils	21	46.3810	12.4317	44.2858		
TOTAL SAMPLE	48	43.8750	10.7062			

TABLE 34

SCHOOL F

ANALYSIS OF COVARIANCE WITH THE JUNE, 1967, REGENTS EXAMINATION IN BIOLOGY AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	29	76.5517	8.4329	77.8604	4.2672377
Conventional Pupils	29	75.0000	10.4198	73.6913	.05
Team Taught Females	18	76.3333	9.7980	77.2390	0.0290756
Conventional Females	20	77.5500	8.6481	76.7349	NS
Team Taught Males	11	76.9091	5.9742	77.7834	10.5556564
Conventional Males	9	69.3333	12.2474	68.2646	.01
All Female Pupils	38	76.9737	9.1045	76.3130	0.5350738
All Male Pupils	20	73.5000	9.8435	74.7553	NS
TOTAL SAMPLE	58	75.7758	9.4277		

TABLE 35

SCHOOL F

ANALYSIS OF COVARIANCE WITH SCORES ON THE UNIT TEST COVERING PLANTS AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	29	24.1034	4.7082	25.0152	8.6705475
Conventional Pupils	29	21.9310	5.7875	21.0193	.01
Team Taught Females	18	25.1111	3.9540	25.6921	3.14711214
Conventional Females	20	23.2500	6.0077	22.7271	NS
Team Taught Males	11	22.4545	5.5383	23.0249	5.0040483
Conventional Males	9	19.0000	5.7009	18.3029	.05
All Female Pupils	38	24.1316	4.8333	23.7700	2.2082052
All Male Pupils	20	20.9000	5.7391	21.5869	NS
TOTAL SAMPLE	58	23.0172	5.3426		

TABLE 36

SCHOOL F

ANALYSIS OF COVARIANCE WITH SCORES ON THE UNIT TEST COVERING CELL PHYSIOLOGY AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	29	23.3103	4.3515	23.6347	1.8670416
Conventional Pupils	29	22.2414	5.0544	21.9170	.NS
Team Taught Females	18	24.9444	4.0941	25.2866	3.6843328
Conventional Females	20	22.4500	5.3849	22.1420	NS
Team Taught Males	11	20.6364	3.4431	20.6503	0.2828003
Conventional Males	9	21.7778	4.4939	21.7606	.NS
All Female Pupils	38	23.6316	4.9178	23.4606	2.4120760
All Male Pupils	20	21.1500	3.8835	21.4748	NS
TOTAL SAMPLE	58	22.7758	4.7055		

TABLE 37

SCHOOL F

ANALYSIS OF COVARIANCE WITH SCORES ON THE UNIT TEST COVERING BODY SYSTEMS AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	29	22.1034	5.4860	22.4238	5.3401451
Conventional Pupils	29	19.6552	5.8632	19.3348	.05
Team Taught Females	18	22.0555	5.7647	22.5830	2.1363182
Conventional Females	20	20.2500	6.0077	19.7753	NS
Team Taught Males	11	22.1818	5.2691	22.6123	4.4625254
Conventional Males	9	18.3333	5.6347	17.8072	NS
All Female Pupils	38	21.1053	5.8853	20.8918	0.0011673
All Male Pupils	20	20.4500	5.6427	20.8555	NS
TOTAL SAMPLE	58	20.8793	5.7616		

TABLE 38

SCHOOL F

ANALYSIS OF COVARIANCE WITH SCORES ON THE UNIT TEST COVERING GENETICS AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	29	25.7931	5.4273	26.0847	4.2024984
Conventional Pupils	29	23.2414	6.0749	22.9497	.05
Team Taught Females	18	27.6111	5.8324	27.9113	3.3999777
Conventional Females	20	24.2000	6.2121	23.9298	NS
Team Taught Males	11	22.8182	2.9939	22.9485	0.7561895
Conventional Males	9	21.1111	5.4874	20.9518	NS
All Female Pupils	38	25.8158	6.1988	25.7414	5.2552576
All Male Pupils	20	22.0500	4.2609	22.1912	.05
TOTAL SAMPLE	58	24.5172	5.8527		

TABLE 39

SCHOOL F

ANALYSIS OF COVARIANCE WITH SCORES ON THE UNIT TEST COVERING EVOLUTION AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	29	25.8276	4.6142	26.2271	2.3016033
Conventional Pupils	29	25.0690	3.3693	24.6694	NS
Team Taught Females	18	25.2222	5.0007	25.4989	0.0801623
Conventional Females	20	25.3500	3.7031	25.1010	NS
Team Taught Males	11	26.8182	2.9197	26.9099	2.3669481
Conventional Males	9	24.4444	2.5550	24.3323	NS
All Female Pupils	38	25.2895	4.3035	25.1134	0.8330314
All Male Pupils	20	25.7500	3.5075	26.0846	NS
TOTAL SAMPLE	58	25.4483	4.0226		

TABLE 39A

SCHOOL F

ANALYSIS OF COVARIANCE WITH SCORES ON THE NELSON BIOLOGY TEST AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO	LEVEL OF SIGNIFICANCE
Team Taught Pupils	23	44.4348	8.3819	45.8586	4.8465939	.05
Conventional Pupils	17	43.9412	8.2042	42.0184		
Team Taught Females	16	44.0625	9.0146	45.8164	2.2767944	NS
Conventional Females	15	44.6667	8.4909	42.7958		
Team Taught Males	7	45.2857	7.2965	45.9749	1.9549799	NS
Conventional Males	2	38.5000	0.7071	36.0879		
All Female Pupils	31	44.3548	8.6238	43.6164	1.9594431	NS
All Male Pupils	9	43.7778	6.9961	46.3212		
TOTAL SAMPLE	40	44.2250	8.2041			

APPENDIX B

TABLE 40

ALL SCHOOLS

ANALYSIS OF COVARIANCE WITH THE JUNE, 1967, REGENTS EXAMINATION IN BIOLOGY AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	261	74.2069	10.6987	74.3378	0.0313644
Conventional Pupils	268	74.6418	10.2321	74.5143	NS
Team Taught Females	126	75.1190	10.5395	75.6251	0.0442589
Conventional Females	113	76.0354	9.9776	75.4711	NS
Team Taught Males	135	73.3555	10.8142	73.2574	0.02492094
Conventional Males	155	73.6258	10.3272	73.7113	NS
All Female Pupils	239	75.5523	10.2666	75.0477	2.4325132
All Male Pupils	290	73.5000	10.5393	73.9158	NS
TOTAL SAMPLE	529	74.4272	10.4572		

TABLE 41

ALL SCHOOLS

ANALYSIS OF COVARIANCE WITH SCORES ON THE UNIT TEST COVERING PLANTS AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	261	24.7663	5.8490	24.8146	2.5155268 NS
Conventional Pupils	268	24.1194	6.5108	24.0723	
Team Taught Females	126	25.6111	4.8083	25.7482	1.4145622 NS
Conventional Females	113	25.1681	5.6662	25.0152	
Team Taught Males	135	23.9778	6.5965	23.9397	0.6392748 NS
Conventional Males	155	23.3548	6.9821	23.3880	
All Female Pupils	239	25.4017	5.2250	25.0576	4.9075203 .05
All Male Pupils	290	23.6448	6.8008	23.9284	
TOTAL SAMPLE	529	24.4386	6.1957		

TABLE 42

ALL SCHOOLS

ANALYSIS OF COVARIANCE WITH SCORES ON THE UNIT TEST COVERING CELL PHYSIOLOGY AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	261	22.8774	5.0847	22.9433	0.9013285
Conventional Pupils	268	22.6754	5.0350	22.6112	NS
Team Taught Females	126	23.4603	4.6607	23.6166	0.4888202
Conventional Females	113	23.4336	4.8401	23.2594	NS
Team Taught Males	135	22.3333	5.4114	22.2995	0.0969067
Conventional Males	155	22.1226	5.1173	22.1521	NS
All Female Pupils	239	23.4477	4.7364	23.1859	3.8658476
All Male Pupils	290	22.2207	5.2481	22.4365	.05
TOTAL SAMPLE	529	22.7750	5.0558		

TABLE 43

ALL SCHOOLS

ANALYSIS OF COVARIANCE WITH SCORES ON THE UNIT TEST COVERING BODY SYSTEMS AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	261	22.2452	6.1938	22.2934	0.0084630 NS
Conventional Pupils	268	22.3809	5.7603	22.3337	
Team Taught Females	126	22.9206	5.9068	23.0631	0.7927645 NS
Conventional Females	113	22.6637	5.4929	22.5049	
Team Taught Males	135	21.6148	6.4078	21.5696	1.2095299 NS
Conventional Males	155	22.1742	5.9567	22.2135	
All Female Pupils	239	22.7991	5.7034	22.6920	2.2129946 NS
All Male Pupils	290	21.9138	6.1664	22.0021	
TOTAL SAMPLE	529	22.3138	5.9728		

TABLE 44

ALL SCHOOLS

ANALYSIS OF COVARIANCE WITH SCORES ON THE UNIT TEST COVERING GENETICS AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	261	27.0881	6.5800	27.1335	0.2594298
Conventional Pupils	268	27.4067	6.2539	27.3625	NS
Team Taught Females	126	28.0476	6.3092	28.2719	0.0199144
Conventional Females	113	28.4336	5.9879	28.1835	NS
Team Taught Males	135	26.1926	6.7232	26.1188	0.9545876
Conventional Males	155	26.6581	6.3558	26.7223	NS
All Female Pupils	239	28.2301	6.1495	28.0277	8.3406582
All Male Pupils	290	26.4414	6.5221	26.6082	.01
TOTAL SAMPLE	529	27.2495	6.4127		

TABLE 45

ALL SCHOOLS

ANALYSIS OF COVARIANCE WITH SCORES ON THE UNIT TEST COVERING EVOLUTION AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	ADJUSTED MEAN	F-RATIO/ LEVEL OF SIGNIFICANCE
Team Taught Pupils	261	25.9847	4.7353	26.0382	0.0000000
Conventional Pupils	268	26.0746	5.0185	26.0225	NS
Team Taught Females	126	25.9286	4.8993	26.1686	0.0000000
Conventional Females	113	26.4425	4.6694	26.1748	NS
Team Taught Males	135	26.0370	4.5947	25.9903	0.0866442
Conventional Males	155	25.8064	5.2572	25.8472	NS
All Female Pupils	239	26.1715	4.7888	25.8803	0.5120097
All Male Pupils	290	25.9138	4.9527	26.1538	NS
TOTAL SAMPLE	529	26.0302	4.8764		

TABLE 46

ALL SCHOOLS

ANALYSIS OF COVARIANCE WITH SCORES ON THE NELSON BIOLOGY TEST AS THE DEPENDENT VARIABLE

GROUP IDENTITY	NUMBER	MEAN	STANDARD DEVIATION	MEAN	F-RATIO	LEVEL OF SIGNIFICANCE
Team Taught Pupils	182	37.1429	15.6682	40.0291	3.7114487	NS
Conventional Pupils	194	44.2938	9.5267	41.5861		
Team Taught Females	94	42.7021	9.3784	43.2845	1.5714865	NS
Conventional Females	86	45.1628	8.4559	44.5262		
Team Taught Males	88	44.2841	10.4430	43.6762	0.1467765	NS
Conventional Males	108	43.6018	10.2865	44.0971		
Female Pupils	180	43.8778	9.0094	43.3968	1.4201937	NS
Male Pupils	196	43.9082	10.3360	44.3499		
TOTAL SAMPLE	376	40.8324	13.3419			

APPENDIX C

APPENDIX C

QUESTIONNAIRE

To: BIOLOGY TEACHERS, TEAM TEACHING STUDY

The results of this questionnaire will aid in interpreting the data collected as part of this study. It may also help to guide others as they consider Team Teaching and other associated changes in current school practices.

There are three parts to the questionnaire. While there is some overlap, each has a slightly different purpose.

Part A is an opinionaire and requests your honest judgment.

Part B is an attempt to better describe Team Teaching as it was practiced in this study.

Part C includes statements that were not answered on the tapes and are essentially concerned with this study.

PART A

This part consists of a list of statements made about Team Teaching. These are from many sources, including our own study.

Consider each statement carefully, then check only once in the appropriate column:

________P - Yes, Potentially

________O - Yes. In our situation.

________N - No. Not in our situation

________S - No. Probably not in any situation.

________U - Undecided.

A mark in column O means that you agree and/or that the statement was or is true in your school situation.

A mark in column P means that the statement is probably true of Team Teaching in general, that your situation didn't produce any negative evidence and/or that it might not be observed until after Team Teaching had been in effect longer in a school situation designed to foster Team Teaching.

N means the opposite of O

S means the opposite of P

Undecided - means that the statement was not tested at all in your situation or that the evidence and your opinion are evenly divided pro and con.

TEAM TEACHING - THE TEAM ORGANIZATION -

	P	O	N	S	U
1. Is more enjoyable because					
a.					
b.					
2. Is a greater challenge to:					
a. teachers					
b. students					
3. Is more work because					
a. It requires more preparation					
b. Requires more planning time					
4. Leaves the teacher less tired at the end of					
a. the day					
b. the week					
5. Makes better use of the subject talents of the teacher					
6. Takes advantage of the special behavioral skills of the teacher					
7. Develops leadership (in the team)					
This benefits - a. students					
b. teachers					
c. administrators					
8. Results in better tests that are more:					
a. Uniform					
b. Fair					
C. Valid					
d. Reliable					
9. Is a better way to induct new teachers into the faculty					

	P	O	N	S	U
10. Is a better way to train interns and practice teachers because:					
a. a variety of teaching approaches is observed	---				
b. they benefit from the criticism of the Team and the several points of view					
c. they can practice several roles but can concentrate on one at a time					
11. Is most easily adapted to by inexperienced or relatively inexperienced teachers					
12. Requires at least three teachers to operate efficiently					
13. Makes it easier (and more likely) to get a request responded to by the administration					
14. Permits some problem to be solved that otherwise would have to be referred to the administration					
15. Permits a lower teacher-pupil ratio (More students assigned per teacher)					
16. Would work best with the 50-90 percentiles					
17. Is a poor method for the bottom:					
a. 50%					
b. 30%					
c. 10%					
18. Makes more efficient use of:					
a. films & film projector					
b. filmstrips and "					
c. overhead projector					
19. Makes more effective use of:					
a. films					
b. filmstrips					
c. overhead transparencies					

	P	Q	N	S	U
20. Results in greater student interest in biology					
a. during the course					
b. after the course					
21. Makes practical and effective use of teacher aides.					
22. Results in a better course of study, and					
a. has a more logical sequence of topics					
b. has a more logical sequence of concepts					
c. is fitted more closely to the changing interest of students					
23. Permits varying group size to fit instructional purpose					
24. Permits a varied class period length					
25. Permits grouping and regrouping according to instructional need					
26. Results in improved guidance because of pooled information about students					
27. Permits better identification and use of community resources					
28. Makes it easier to plan and take field trips					
29. Provides an organization to foster continuity from one year to the next despite personnel changes					
30. Provides more time and opportunity to give special help to students who need it					
31. Results in greater student motivation					
32. Is too sophisticated an approach for 10th graders					
33. Enhances opportunities for professional advancement					

	P	O	N	S	U
34. Requires teachers to be more up-to-date in					
a. subject-matter knowledge					
b. teaching methods and curricular developments					
35. Encourage or stimulates teachers to become more up-to-date in:					
a. subject-matter knowledge					
b. teaching methods and curricular developments					
36. Requires more total-planning time					
37. Provides more planning time					
38. Provides more opportunities for individual study by:					
a. students					
b. teachers					
39. Generates greater					
a. teacher enthusiasm					
b. student enthusiasm					
40. Develops better study habits in students					
41. Makes it possible to provide a greater variety of resource materials					
42. Results in higher					
a. academic achievement					
b. skill achievement					
43. Results in greater articulation between classroom and laboratory					
44. Makes record-keeping more complicated					

PART B

The following statements have been made to describe the difference between Team Teaching and Conventional Teaching. Study each statement then check ✓ column:

__T__ if it is unique or definitely more characteristic of the team approach

__B__ if it is characteristic of both approaches, but not of one significantly more than the other.

__C__ if it is unique or definitely more characteristic of the conventional approach.

__N__ if it is characteristic of neither

. . o . .

	T	B	C	N
1. The course of study is quite rigid and inflexible				
2. Lectures are quite formal				
a. in organization				
b. in manner of presentation				
3. Presentations of new material are made in lecture style				
4. Presentations of new material involve much teacher talk and little student questioning				
5. Superior students are				
a. Easily identified				
b. assisted to plan program of individual study				
6. Students with learning difficulties				
a. are easily identified				
b. are given specialized and individual help				
7. Films and filmstrips fit specific instructional objectives				
8. The special subject-matter competencies of teachers are taken advantage of				
9. The special teaching skills of teachers are used more				
a. efficiently				
b. effectively				

	T	B	C	N
10. Non-teaching employees are used more				
a. efficiently	____	____	____	____
b. effectively	____	____	____	____
11. Students may be grouped and re-grouped according to instructional purpose	____	____	____	____
12. A variety of teaching procedures may be employed during a				
a. class period	____	____	____	____
b. day	____	____	____	____
c. week	____	____	____	____
13. The teacher becomes personally acquainted with all students	____	____	____	____
14. Films are regularly used -	____	____	____	____
15. The overhead projector is used				
a. regularly	____	____	____	____
16. Outside experts are brought in as special speakers	____	____	____	____
17. Class size may be reduced to 8-12	____	____	____	____
18. The library and curriculum resource center are regularly used.	____	____	____	____
19. Students are grouped by:				
a. ability	____	____	____	____
b. interest	____	____	____	____
c. past achievement in this course.	____	____	____	____
d. need	____	____	____	____
20. Teachers give and receive constructive criticism.	____	____	____	____
21. More time is available for				
a. planning	____	____	____	____
B. teacher-teacher conference	____	____	____	____
c. teacher-student conference	____	____	____	____
d. teacher-parent conference	____	____	____	____
e. teacher-supervision conference	____	____	____	____

	T	B	C	N
22. Services of the department head are used -				
a. frequently	______	______	______	______
b. more effectively	______	______	______	______
23. Overall there is much teacher-pupil interaction	______	______	______	______
24. Discipline problems are few	______	______	______	______
25. Students are stimulated to read widely outside the textbooks	______	______	______	______

PART C

STATEMENTS CONCERNING THE TEAM TEACHING PROJECT

Below are some statements which ask for your opinion about Team Teaching. These statements relate to Team Teaching in general and Team Teaching as it is operated in your school. For each statement, please indicate whether you agree or disagree with it (+ or -). All answers will be treated in strict confidence.

( ) 1. Our participation in the Team Teaching Study had sufficient support of the administration.

( ) 2. Our team had sufficient planning time.

( ) 3. By the time I started team teaching, I had adequate information about it.

( ) 4. We expected more supervision from the staff at the University of Rochester.

( ) 5. Although we were a teaching team, we still operated somewhat independently from each other.

( ) 6. It is important for team members to be congruent.

( ) 7. Our team organization allowed us to take advantage of the interests and special skills of the individual members.

( ) 8. It is necessary for a team to have a leader.

( ) 9. There is probably more innovative potential in Team Teaching than we realized.

( ) 10. Team Teaching is much better for the inexperienced teacher than for the experienced teacher.

( ) 11. The students that participated in the Team Teaching Study were sufficiently informed about this method.

( ) 12. Team Teaching is probably a better method for the above-average student only.

( ) 13. Team Teaching allows students to be more independent.

( ) 14. If used properly, Team Teaching is suitable to all students.

( ) 15. Team Teaching allows students to develop critical thinking.

( ) 16. There are certain skills which students need to learn if they are to participate successfully in Team Teaching.

( ) 17. Our team planning sessions included teachers who were not part of the team.

( ) 18. Our experience was characterized by the lack of a team effort.

( ) 19. Some teachers are better suited for Team Teaching than others.

( ) 20. Probably any teacher can be trained to work in a team situation.

Statements concerning the Team Teaching Project (continued)

( ) 21. Team Teaching in our school was hampered by a lack of physical facilities.

( ) 22. My participation in Team Teaching helped me in my conventional classes.

( ) 23. I would like to have more experience with Team Teaching.

( ) 24. Students who participate in Team Teaching should receive training in note-taking.

( ) 25. Team Teaching provided me with an opportunity to become better acquainted with individual students.

( ) 26. Tenth graders are probably ready for Team Teaching.

( ) 27. Our team probably could have done a better job of preparing the students.

( ) 28. Our second year in the Team Teaching Study was much better than the first year.

( ) 29. Team Teaching places too many constraints on how a teacher teaches.

( ) 30. Sharing of duties is an important feature of Team Teaching.

( ) 31. Teacher interaction in the form of discussions is an important feature of Team Teaching.

( ) 32. Our team rarely had an opportunity to discuss ideas and problems.

( ) 33. Evaluation by the other team members is an invaluable feature of Team Teaching.

( ) 34. Our team members rarely had an opportunity to observe one another.

( ) 35. Even though we had the opportunity, our team rarely discussed ideas and problems.

( ) 36. Even though we had the opportunity,our team members rarely observed one another.

( ) 37. A team leader is necessary to coordinate the activities of the team.

( ) 38. Student selection is crucial for the success of Team Teaching.

( ) 39. I feel that the exchange of information with teams in other schools was valuable.

( ) 40. The exchange of information with teams from other schools was an excellent learning experience.

( ) 41. Students did not feel free to raise questions during the lecture sessions.

( ) 42. During the lecture sessions we encouraged student participation.

( ) 43. Team Teaching provides the teacher with a greater degree of professional responsibility than do conventional methods.

( ) 44. I don't really see how Team Teaching can improve the student's learning experience.

( ) 45. Participating in an experimental study, such as Team Teaching, most often results in improved teacher performance.

. . . . o . . . .

7-17-70 END